



Independent Statistics and Analysis  
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# Introduction and Key Concepts: State Energy-Related Carbon Dioxide Emissions Tables

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## Introduction and Overview

Energy-related carbon dioxide (CO<sub>2</sub>) emissions vary significantly across states on both an absolute basis and on a per-capita basis. Total state CO<sub>2</sub> emissions include CO<sub>2</sub> emissions from direct fuel use across all sectors, including residential, commercial, industrial, and transportation, as well as primary fuels consumed for electricity generation.

The term *energy-related CO<sub>2</sub> emissions*, as used in these tables, refers to emissions released at the location where fossil fuels are combusted. If fuels are combusted in one state to generate electricity consumed in another state, we attribute the emissions to the state where the electricity was generated. For nonfuel uses of fossil fuels, we allocate the carbon stored in products such as plastics to the states where the petrochemicals are produced.

The calculations presented in these tables also assume that biomass used by electricity generators, by industries, and by homes and commercial buildings is carbon neutral, meaning the combustion emissions are fully offset by land sinks in a sustainable biomass cycle. Emissions may be underestimated to the extent that actual use of biomass energy may not be carbon neutral.

### Table 1. Total state emission levels

Because of differences in how we collect and calculate national- and state-level energy consumption and emissions data, the combined total of energy-related CO<sub>2</sub> emissions for all states shown in Table 1 is not the same as the national total shown in the [Monthly Energy Review](#) (MER).

### Table 2. Emissions by fuel

States have very different emissions profiles, based on the energy fuel mix used by generators in the state. For example, some states use more carbon-intensive fuels such as coal for most of their electricity generation, and other states use less carbon-intensive fuels such as natural gas or non-carbon emitting renewable sources.

### Table 3. Emissions by sector

CO<sub>2</sub> emissions also vary significantly across states by sector, based on factors such as different climates, different sources of economic outputs (for example, commercial versus industrial activity), and different fuels used for electricity generation.

### Table 4. Per capita carbon dioxide emissions

We can divide the total CO<sub>2</sub> emissions for a state by the state's population to examine the CO<sub>2</sub> emissions on a per capita basis. In addition to population density, the factors that affect a state's total levels of CO<sub>2</sub> emissions include:

- Climate
- The structure of the state economy
- Energy sources
- Building standards
- Explicit state policies to reduce emissions

These factors also contribute to variation in emissions per capita among the states.

### Table 5. Energy intensity

The energy intensity of a state, as measured by the amount of energy consumed per unit of economic output (specifically, British thermal units [Btu] per dollar of a state's gross domestic product [GDP]), plays an important role in its overall emissions profile. The states with relatively high-energy intensities tend to be in cold climates, are mostly rural, or have a large industrial base relative to their overall economies. The states with the highest rates of energy-related CO<sub>2</sub> emissions per capita also tend to have higher energy-intensity values. Many of the states with the lowest energy intensities are in the relatively densely populated New England and Middle Atlantic regions.

### Table 6. Carbon intensity of the energy supply

The carbon intensity of energy supply (CO<sub>2</sub> emissions/Btu of energy supplied) reflects the energy fuel mix within a state. As with energy intensity, the states with a more carbon-intensive energy supply tend to be the states with high per capita emissions. The states with less carbon-intensive energy supply tend to be those states with relatively substantial non-carbon electricity generation from sources such as nuclear or hydropower.

### Table 7. Carbon intensity of the economy

The overall carbon intensity of the economy (CO<sub>2</sub> emissions/dollars of state GDP) combines energy intensity with the carbon intensity of that state's energy consumption. States with the highest carbon intensity of their economies, as measured in metric ton of CO<sub>2</sub> per million dollars of state GDP (metric ton CO<sub>2</sub>/million [chained](#) 2017 dollars of GDP), are also the states with the highest values of energy intensity and carbon intensity of that energy supply (Tables 5 and 6). The states with the lowest carbon intensity of economic activity are also states that appear on the lower end of both energy intensity and the carbon intensity of that energy supply.

### Table 8. Electricity trade

These data tables assign all emissions related to the primary energy consumed for generating electricity to the state where that electricity is generated rather than where it is consumed. As a result, the states that generate electricity from fossil fuels (especially coal) and sell that electricity across state lines tend to have higher per capita CO<sub>2</sub> emissions than states that consume more electricity than they produce. If one could associate the emissions from the generation of electricity to the states where that electricity is consumed, the emissions profiles of both the producing and consuming states would be different in many cases. In an index of net electricity trade, a value more than 1.0 indicates a net interstate exporter of electricity, a value less than 1.0 indicates a net interstate importer of electricity, and a value equal to 1.0 indicates a state generates as much electricity as it consumes.

### Other state-related data products

The underlying energy data used to calculate the state-level CO<sub>2</sub> values is available in [the State Energy Data System \(SEDS\)](#). SEDS is the main repository for all of our state-based energy data.

Our State Energy Profiles contain [narratives and rankings for each state](#) as well as [electricity data and analysis](#).

We also have two fuel-specific profiles: the [State Renewable Energy Profiles](#) and the [state nuclear profiles](#).

Our [interactive energy map](#) shows the major energy facilities and infrastructure in the United States.

We also collect data on [state emissions for the electric power industry](#) for sulfur dioxide and nitrogen oxides in addition to CO<sub>2</sub>. The electric power industry includes electricity generated in the electric power, industrial, and commercial sectors. The downloadable spreadsheet includes U.S. electric power industry estimated emissions by state, starting in 1990 (Form EIA-860 and Form EIA-923).

[The State Energy Portal](#) offers a number of ways to examine energy and energy-related CO<sub>2</sub> emissions data.